CHAPTER 31
SPECIAL CONSTRUCTION

User notes:

About this chapter: *Chapter 31 provides regulations for unique buildings and building elements. Those include buildings such as membrane structures, greenhouses and relocatable buildings. Special elements include pedestrian walkways and tunnels, awnings, canopies and marquees, vehicular gates, solar energy systems, public use restrooms in flood hazard areas, and intermodal shipping containers.*

Code development reminder: *Code change proposals to sections preceded by the designation [BS] will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*

SECTION 3101
GENERAL

[W] 3101.1 Scope. The provisions of this chapter shall govern special building construction including *membrane structures*, temporary structures, *pedestrian walkways* and tunnels, automatic *vehicular gates*, *awnings* and *canopies*, *marquees*, signs, towers, antennas, relocatable buildings, swimming pool enclosures and safety devices, solar energy systems, public use restroom buildings on publicly owned lands in *flood hazard areas*, ((~~and~~)) *intermodal shipping containers*, and fixed guideway transit and passenger rail systems.

SECTION 3102
MEMBRANE STRUCTURES

3102.1 General. The provisions of Sections 3102.1 through 3102.8 shall apply to *air-supported*, *air-inflated*, *membrane-covered cable*, *membrane-covered frame* and tensile *membrane structures*, collectively known as *membrane structures*, erected for a period of 180 days or longer. Those erected for a shorter period of time shall comply with the *International Fire Code*. Membrane structures covering water storage facilities, water clarifiers, water treatment plants, sewage treatment plants, *greenhouses* and similar facilities not used for human occupancy are required to meet only the requirements of Sections 3102.3.1 and 3102.7. Membrane structures erected on a building, balcony, deck or other structure for any period of time shall comply with this section.

3102.2 Tensile membrane structures and air-supported structures. *Tensile membrane structures* and *air-supported structures*, including permanent and temporary structures, shall be designed and constructed in accordance with ASCE 55. The provisions in Sections 3102.3 through 3102.6 shall apply.

3102.3 Type of construction. *Noncombustible membrane structures* shall be classified as Type IIB construction. Noncombustible frame or cable-supported structures covered by an *approved* membrane in accordance with Section 3102.3.1 shall be classified as Type IIB construction. Heavy timber frame-supported structures covered by an *approved* membrane in accordance with Section 3102.3.1 shall be classified as Type IV-HT construction. Other membrane structures shall be classified as Type V construction.

Exception: Plastic less than 30 feet (9144 mm) above any floor used in *greenhouses*, where occupancy by the general public is not authorized, and for aquaculture pond covers is not required to meet the fire propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701.

3102.3.1 Membrane and interior liner material. Membranes and interior liners shall be either noncombustible as set forth in Section 703.3 or meet the fire propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 and the manufacturer's test protocol.

Exception: Plastic less than 20 mil (0.5 mm) in thickness used in *greenhouses*, where occupancy by the general public is not authorized, and for aquaculture pond covers is not required to meet the fire propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701.

3102.4 Allowable floor areas. The area of a membrane structure shall not exceed the limitations specified in Section 506.

3102.5 Maximum height. Membrane structures shall not exceed one *story* nor shall such structures exceed the height limitations in feet specified in Section 504.3.

Exception: *Noncombustible membrane structures* serving as roofs only.

3102.6 Mixed construction. Membrane structures shall be permitted to be utilized as specified in this section as a portion of buildings of other types of construction. Height and area limits shall be as specified for the type of construction and occupancy of the building.

3102.6.1 Noncombustible membrane. A noncombustible membrane shall be permitted for use as the roof or as a skylight of any building or *atrium* of a building of any type of construction provided that the membrane is not less than 20 feet (6096 mm) above any floor, balcony or gallery.

3102.6.1.1 Membrane. A membrane meeting the fire propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 shall be permitted to be used as the roof or as a skylight on buildings of Type IIB, III, IV-HT and V construction, provided that the membrane is not less than 20 feet (6096 mm) above any floor, balcony or gallery.

3102.7 Engineering design. The structure shall be designed and constructed to sustain *dead loads*; *loads* due to tension or inflation; *live loads* including wind, snow or *flood* and seismic loads and in accordance with Chapter 16.

3102.7.1 Lateral restraint. For *membrane-covered frame structures*, the membrane shall not be considered to provide lateral restraint in the calculation of the capacities of the frame members.

3102.8 Inflation systems. *Air-supported* and *air-inflated structures* shall be provided with primary and auxiliary inflation systems to meet the minimum requirements of Sections 3102.8.1 through 3102.8.3.

3102.8.1 Equipment requirements. The inflation system shall consist of one or more blowers and shall include provisions for automatic control to maintain the required inflation pressures. The system shall be so designed as to prevent overpressurization of the system.

3102.8.1.1 Auxiliary inflation system. In addition to the primary inflation system, in buildings larger than 1,500 square feet (140 m^2) in area, an auxiliary inflation system shall be provided with sufficient capacity to maintain the inflation of the structure in case of primary system failure. The auxiliary inflation system shall operate automatically when there is a loss of internal pressure and when the primary blower system becomes inoperative.

3102.8.1.2 Blower equipment. Blower equipment shall meet all of the following requirements:

1. Blowers shall be powered by continuous-rated motors at the maximum power required for any flow condition as required by the structural design.
2. Blowers shall be provided with inlet screens, belt guards and other protective devices as required by the *building official* to provide protection from injury.
3. Blowers shall be housed within a weather-protecting structure.
4. Blowers shall be equipped with backdraft check dampers to minimize air loss when inoperative.
5. Blower inlets shall be located to provide protection from air contamination. The location of inlets shall be *approved*.

[S] 3102.8.2 ((~~Standby~~)) Legally required standby power. Wherever an auxiliary inflation system is required, an *approved* legally required standby power ((~~generating~~)) system shall be provided. The system shall be equipped with a suitable means for automatically starting the generator set upon failure of the normal electrical service and for automatic transfer and operation of all of the required electrical functions at full power within 60 seconds of such service failure. ((~~Standby~~)) The legally required standby power system shall be capable of operating independently for not less than 4 hours.

3102.8.3 Support provisions. A system capable of supporting the membrane in the event of deflation shall be provided for in *air-supported* and *air-inflated structures* having an *occupant load* of 50 or more or where covering a swimming pool regardless of *occupant load*. The support system shall be capable of maintaining membrane structures used as a roof for Type I construction not less than 20 feet (6096 mm) above floor or seating areas. The support system shall be capable of maintaining other membranes not less than 7 feet (2134 mm) above the floor, seating area or surface of the water.

SECTION 3103
TEMPORARY STRUCTURES

[S] 3103.1 ((~~General.~~ The provisions of Sections 3103.1 through 3103.4 shall apply to structures erected for a period of less than 180 days. *Special event structures*, tents, umbrella structures and other membrane structures erected for a period of less than 180 days shall also comply with the *International Fire Code*. Those erected for a longer period of time shall comply with applicable sections of this code.)) See Section 106.13.

((~~3103.1.1 Conformance.~~ Temporary structures and uses shall conform to the structural strength, fire safety, *means of egress*, accessibility, light, *ventilation* and sanitary requirements of this code as necessary to ensure public health, safety and general welfare.

~~3103.1.2 Permit required.~~ Temporary structures that cover an area greater than 120 square feet (11.16 m^2), including connecting areas or spaces with a common *means of egress* or entrance that are used or intended to be used for the gathering

~~together of 10 or more persons, shall not be erected, operated or maintained for any purpose without obtaining a *permit* from the *building official*.~~))

[S] ((~~**3103.2 Construction documents.** A *permit* application and *construction documents* shall be submitted for each installation of a temporary structure. The *construction documents*, shall include a site plan indicating the location of the temporary structure and information delineating the *means of egress* and the *occupant load*.~~))

[S] ((~~**3103.3 Location.** Temporary structures shall be located in accordance with the requirements of Table 705.5 based on the *fire-resistance rating* of the *exterior walls* for the proposed type of construction.~~))

[S] ((~~**3103.4 Means of egress.** Temporary structures shall conform to the *means of egress* requirements of Chapter 10 and shall have an *exit access* travel distance of 100 feet (30 480 mm) or less.~~))

SECTION 3104
PEDESTRIAN WALKWAYS AND TUNNELS

3104.1 General. This section shall apply to connections between buildings such as *pedestrian walkways* or tunnels, located at, above or below grade level, that are used as a means of travel by persons. The *pedestrian walkway* shall not contribute to the *building area* or the number of *stories* or height of connected buildings.

3104.1.1 Application. *Pedestrian walkways* shall be designed and constructed in accordance with Sections 3104.2 through 3104.9. Tunnels shall be designed and constructed in accordance with Sections 3104.2 and 3104.10.

3104.2 Separate structures. Buildings connected by *pedestrian walkways* or tunnels shall be considered to be separate structures.

Exceptions:

1. Buildings that are on the same lot and considered as portions of a single building in accordance with Section 503.1.2.
2. For purposes of calculating the number of *Type B units* required by Chapter 11, structurally connected buildings and buildings with multiple wings shall be considered to be one structure.

3104.3 Construction. The *pedestrian walkway* shall be of noncombustible construction.

Exceptions:

1. Combustible construction shall be permitted where connected buildings are of combustible construction.
2. *Fire-retardant-treated wood*, in accordance with Section 603.1, Item 1.3, shall be permitted for the roof construction of the *pedestrian walkway* where connected buildings are not less than Type I or II construction.

3104.4 Contents. Only materials and decorations *approved* by the *building official* shall be located in the *pedestrian walkway*.

3104.5 Connections of pedestrian walkways to buildings. The connection of a *pedestrian walkway* to a building shall comply with Section 3104.5.1, 3104.5.2, 3104.5.3 or 3104.5.4.

Exception: Buildings that are on the same lot and considered as portions of a single building in accordance with Section 503.1.2.

3104.5.1 Fire barriers. *Pedestrian walkways* shall be separated from the interior of the building by not less than 2-hour *fire barriers* constructed in accordance with Section 707 and Sections 3104.5.1.1 through 3104.5.1.3.

3104.5.1.1 Exterior walls. *Exterior walls* of buildings connected to *pedestrian walkways* shall be 2-hour fire-resistance rated. This protection shall extend not less than 10 feet (3048 mm) in every direction surrounding the perimeter of the *pedestrian walkway*.

3104.5.1.2 Openings in exterior walls of connected buildings. Openings in *exterior walls* required to be fire-resistance rated in accordance with Section 3104.5.1.1 shall be equipped with opening protectives providing a not less than 3/4-hour *fire protection rating* in accordance with Section 716.

3104.5.1.3 Supporting construction. The *fire barrier* shall be supported by construction as required by Section 707.5.1.

3104.5.2 Alternative separation. The wall separating the *pedestrian walkway* and the building shall comply with Section 3104.5.2.1 or 3104.5.2.2 where:

1. The distance between the connected buildings is more than 10 feet (3048 mm).
2. The *pedestrian walkway* and connected buildings are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, and the roof of the walkway is not more than 55 feet (16 764 mm) above grade connecting to the fifth, or lower, *story above grade plane*, of each building.

Exception: *Open parking garages* need not be equipped with an *automatic sprinkler system*.

3104.5.2.1 Passage of smoke. The wall shall be capable of resisting the passage of smoke.

3104.5.2.2 Glass. The wall shall be constructed of a tempered, wired or laminated glass and doors separating the interior of the building from the *pedestrian walkway*. The glass shall be protected by an *automatic sprinkler system* in accordance with Section 903.3.1.1 that, when actuated, shall completely wet the entire surface of interior sides of the wall or glass. Obstructions shall not be installed between the sprinkler heads and the wall or glass. The glass shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler operates.

3104.5.3 Open sides on walkway. Where the distance between the connected buildings is more than 10 feet (3048 mm), the walls at the intersection of the *pedestrian walkway* and each building need not be fire-resistance rated provided that both sidewalls of the *pedestrian walkway* are not less than 50 percent open with the open area uniformly distributed to prevent the accumulation of smoke and *toxic* gases. The roof of the walkway shall be located not more than 40 feet (12 160 mm) above *grade plane*, and the walkway shall only be permitted to connect to the third or lower *story* of each building.

Exception: Where the *pedestrian walkway* is protected with an automatic sprinkler system in accordance with Section 903.3.1.1, the roof of the walkway shall be located not more than 55 feet (16 764 mm) above *grade plane* and the walkway shall only be permitted to connect to the fifth or lower *story* of each building.

3104.5.4 Exterior walls greater than 2 hours. Where *exterior walls* of connected buildings are required by Section 705 to have a *fire-resistance rating* greater than 2 hours, the walls at the intersection of the *pedestrian walkway* and each building need not be fire-resistance rated provided:

1. The *pedestrian walkway* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.
2. The roof of the walkway is not located more than 55 feet (16 764 mm) above *grade plane* and the walkway connects to the fifth, or lower, *story above grade plane* of each building.

[S] 3104.6 Public way. *Pedestrian walkways* over a *public way* shall comply with Chapter 32 and the Street Use Ordinance, *Seattle Municipal Code* Title 15.

3104.7 Egress. Access shall be provided at all times to a *pedestrian walkway* that serves as a required *exit*.

3104.8 Width. The unobstructed width of *pedestrian walkways* shall be not less than 36 inches (914 mm). The total width shall be not greater than 30 feet (9144 mm).

3104.9 Exit access travel. The length of *exit access* travel shall be 200 feet (60 960 mm) or less.

Exceptions:

1. *Exit access* travel distance on a *pedestrian walkway* equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be 250 feet (76 200 mm) or less.
2. *Exit access* travel distance on a *pedestrian walkway* constructed with both sides not less than 50 percent open shall be 300 feet (91 440 mm) or less.
3. *Exit access* travel distance on a *pedestrian walkway* constructed with both sides not less than 50 percent open, and equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, shall be 400 feet (122 m) or less.

3104.10 Tunneled walkway. Separation between the tunneled walkway and the building to which it is connected shall be not less than 2-hour fire-resistant construction and openings therein shall be protected in accordance with Section 716.

SECTION 3105
AWNINGS AND CANOPIES

[S] ((~~3105.1 General.~~ ~~*Awnings* and *canopies* shall comply with the requirements of Sections 3105.2 and 3105.3 and other applicable sections of this code.~~))

[S] ((~~3105.2 Design and construction.~~ ~~*Awnings* and *canopies* shall be designed and constructed to withstand wind or other lateral *loads* and *live loads* as required by Chapter 16 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. *Awnings* shall have frames of noncombustible material, *fire-retardant-treated wood*, heavy timber complying with Section 2304.11, or 1-hour construction with combustible or noncombustible covers and shall be either fixed, retractable, folding or collapsible.~~))

[S] ((~~3105.3 Awnings and canopy materials.~~ ~~*Awnings* and *canopies* shall be provided with an *approved* covering that complies with one of the following:~~

~~1. The fire propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701.~~

~~2. Has a *flame spread index* not greater than 25 when tested in accordance with ASTM E84 or UL 723.~~

~~3. Meets all of the following criteria when tested in accordance with NFPA 286:~~

~~3.1. During the 40 kW exposure, flames shall not spread to the ceiling.~~

~~3.2. Flashover, as defined in NFPA 286, shall not occur.~~

~~3.3. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.~~

~~3.4. The peak heat release rate throughout the test shall not exceed 800 kW.~~

~~**Exception:** The fire propagation performance and *flame spread index* requirements shall not apply to awnings installed on detached one- and two-family dwellings.~~))

[S] 3105.1 General. All *awnings* and *canopies* are subject to the requirements of this section. A *marquee* is a type of *canopy* and is subject to this section. *Awnings* and *canopies* containing electrical wiring and light fixtures are also subject to the requirements of the *Seattle Electrical Code*. *Awnings* and *canopies* over a public place shall comply with the *Seattle Municipal Code* Title 15, *Street Use Code*.

[S] 3105.2 Definitions. Definitions of "sign" and various types of signs are found in *Seattle Municipal Code*, Title 23, *Land Use Code*, Chapter 23.84A, Definitions, and Chapter 2 of this code.

[S] 3105.3 Permits.

3105.3.1 Permits required. No *awning* or *canopy* shall be erected, constructed, altered or structurally revised without a permit issued by the *building official*. A single permit may be issued for installation of all *awnings* or *canopies*, without signs, serving a multi-tenant building. Structural repairs and replacement of *awning* coverings requires a permit.

Signs installed on *awnings* and *canopies* shall have a separate sign permit for each separate business entity.

Each subsequent installation of an *awning*, *canopy* or sign shall require a separate permit.

Exception: Maintenance which is limited to painting, repainting, cleaning and minor repairs does not require a permit.

3105.3.2 Permit application. To obtain a permit required by this chapter, the applicant shall file an application which includes the following:

1. The address of the proposed *awning* or *canopy* on the building;
2. Specifications, plans and drawings of the structure, site and vicinity plans, and an identification numbering system for the placement of each proposed *awning* or *canopy* on the elevation and plan view drawings;
3. Signature, contact information and City business license number of the building owner;
4. Signature, contact information and City business license number of the business establishment served by the *awning* or *canopy*;
5. Signature, contact information, City business license number, and State contractor or electrical contractor license number of the installer;
6. Electrical connection and illumination information when the *awning* or *canopy* has electrical components; and
7. Permit fee as specified in the *Fee Subtitle*.

[S] 3105.4 Maintenance. Each *awning* and *canopy*, together with their supports, braces, anchors, and signs shall be maintained in good repair and in a proper state of preservation. The surface of all *awnings* and *canopies* shall be kept clean and *awnings* shall be protected with a sealer-type solution. Failure to maintain any *awning*, *canopy* or sign is a violation and subject to the provisions of Section 103 of this code.

[S] 3105.5 Materials. *Awnings* shall have approved *fire-retardant coverings* or shall comply with the requirements in this code for the materials *used*. *Canopy* materials shall meet the standards for the rigid material *used* as required by this code. Frames shall be of materials allowed for the type of construction of the building.

Exception: Aluminum frames are allowed with all construction types.

3105.5.1 Approval of materials. The *building official* is permitted to require that sufficient technical data be submitted to substantiate the proposed *use* of any materials and is allowed to approve their *use* if it is determined that the evidence submitted is satisfactory for the *use* intended.

[S] 3105.6 Welding. All structural welding shall conform to the requirements of Chapter 20 for aluminum and Chapter 22 for steel.

[S] 3105.7 Electric signs and luminaires. All *electric signs* shall comply with *Seattle Electrical Code* Article 600 and Article 410 for luminaires.

[S] 3105.8 Obstruction of exits, light and ventilation. No portion of the surface or support of an *awning* or *canopy*, including a retracted *awning*, shall be erected, constructed or maintained so as to obstruct any fire escape or standpipe, or any window, door or opening used as a *means of egress*, or so as to prevent free passage from one part of a roof to any other part of a roof.

No *awning*, *canopy*, or portion thereof shall be attached in any form, shape or manner to a fire escape or standpipe, nor be placed in any manner that interferes with any opening providing ventilation or light required by Chapter 12 of this *Code*.

[S] 3105.9 Location. All portions of *awnings* and *canopies* shall be at least 8 feet (2438 mm) above any walking surface immediately below. All portions of *awnings* and *canopies* located over public property shall be at least 8 feet (2438 mm) above grade and at least 2 feet (610 mm) from the curb. *Awnings* and *canopies* shall be located where they will not obstruct, obscure or interfere with any publicly maintained street tree, streetlight or utility pole.

[S] 3105.10 Supports. The supports for *awnings* and *canopies* shall be located on private property.

Exception: Where approved by the Director of Transportation, stanchions for *awnings* located at the entrance to buildings are permitted to be installed on public property if they are located in line with other street furniture. Individual stanchions shall have a cross sectional dimension or diameter no greater than 6 inches (152 mm).

[S] 3105.11 Drainage.

3105.11.1 Awning drainage. *Awnings* shall shed water uniformly from the *awning* covering.

3105.11.2 Canopy drainage. *Canopies* draining away from the *building line* shall shed water uniformly over the *canopy* edge. The upper surface of a *canopy* shall be sloped a minimum of 1 unit vertical in 48 units horizontal (2% slope). Approval shall be obtained from the Director of Public Utilities when a *canopy* drains back toward the building and is connected to an infiltration facility, a side sewer or is conveyed under a sidewalk to a gutter.

[S] 3105.12 Design loads. *Awnings* and *canopies* shall be designed and constructed to resist all forces to which they are subject as specified in Chapter 16. Where signs, *electric signs* or luminaires are attached to an *awning* or *canopy* structure, the additional load of all attachments shall be included in the design loads and shall comply with the requirements of Chapter 16 and Section 3107.10.1 of this *Code*.

[S] 3105.13 Pitch. The upper surface of all *awnings* shall have a pitch of at least 30 degrees (0.52 rad) from the horizontal. The *building official* is authorized to approve *awnings* with a smaller pitch when the design is prepared by a licensed structural engineer.

[S] 3105.14 Attachment of awnings and canopies. All *awnings* and *canopies* attached to masonry, concrete, aluminum, or steel shall be safely secured with steel anchors and bolts, or approved expansion bolts of sufficient size and anchorage to support the loads safely. No support or attachment for an *awning* or *canopy* shall be connected to, supported by, or fastened to exterior veneer.

[S] 3105.15 Size. Where an *awning* or *canopy* is located at an exit door from a stairway or *exit passageway* that is fire-resistance rated, the distance the *awning* or *canopy* projects from the building shall be no more than one-half the distance from the walking surface to the lowest point of the bottom of the *awning* or *canopy*.

[S] 3105.16 Approved materials. The *building official* may require that sufficient technical data be submitted to substantiate the proposed *use* of any material; and may approve *use* of the material if the *building official* determined that the evidence submitted is satisfactory for the intended *use*.

[S] 3105.17 Inspections. All *awnings* and *canopies* regulated by this chapter are subject to inspection by the *building official*. The permit holder must request a final inspection within 3 business days of completing the installation.

[S] 3105.18 Footing or foundation inspection. Footings or foundations for *awnings* and *canopies* are subject to inspection by the *building official.* An inspection must be requested and completed before the footing is filled.

[S] 3105.19 Electrical inspection. All electrical wiring is subject to the *Seattle Electrical Code.* Upon energizing any electrical elements, the permit holder must request an inspection within one business day.

SECTION 3106
MARQUEES

[S] 3106.1 General. ((~~*Marquees* shall comply with Sections 3106.2 through 3106.5 and other applicable sections of this code.~~)) *Marquees* are, by definition, a *canopy* and shall comply with Section 3105.

[S] ((~~3106.2 Thickness.~~ ~~The height or thickness of a *marquee* measured vertically from its lowest to its highest point shall be not greater than 3 feet (914 mm) where the *marquee* projects more than two-thirds of the distance from the *lot line* to the curb line, and shall be not greater than 9 feet (2743 mm) where the *marquee* is less than two-thirds of the distance from the *lot line* to the curb line.~~))

[S] ((~~3106.3 Roof construction.~~ ~~Where the roof or any part thereof is a skylight, the skylight shall comply with the requirements of Chapter 24. Every roof and skylight of a *marquee* shall be sloped to downspouts that shall conduct any drainage from the *marquee* in such a manner so as not to spill over the sidewalk.~~))

[S] ((~~3106.4 Location prohibited.~~ ~~Every *marquee* shall be so located as not to interfere with the operation of any exterior standpipe, and such that the *marquee* does not obstruct the clear passage of *stairways* or *exit discharge* from the building or the installation or maintenance of street lighting.~~))

[S] ((~~3106.5 Construction.~~ ~~A *marquee* shall be supported entirely from the building and constructed of noncombustible materials. *Marquees* shall be designed as required in Chapter 16. Structural members shall be protected to prevent deterioration.~~))

SECTION 3107
SIGNS

[S] ((~~3107.1 General.~~ ~~Signs shall be designed, constructed and maintained in accordance with this code.~~))

[S] 3107.1 General. It is the purpose of this section to safeguard the life, health, property and welfare of people within the City by regulating and controlling the design, quality of materials, construction, location, illumination, and maintenance of signs and *sign structures* that are visible from any portion of public places and rights-of-way.

[S] 3107.2 Enforcement.

3107.2.1 Authority. The Director of Transportation and the *building official* shall enforce the provisions of this chapter as it relates to signs located over public places. "Public places" is defined in Section 15.02.046 of the *Seattle Municipal Code, Street and Sidewalk Use*. The *building official* shall enforce the provisions of this chapter as it relates to signs located over all other property in the City of Seattle.

3107.2.2 Other requirements. All signs shall comply with any additional sign regulations imposed by *Seattle Municipal Code* Title 23, *Land Use Code,* and Title 15, *Street Use Code,* and other City regulations, even when no permit is required. Signs having electrical wiring and light fixtures are subject to the requirements of the *Seattle Electrical Code*.

[S] 3107.3 Definitions.

3107.3.1 Definitions—Land Use Code. The following sign-related definitions are found in the Seattle *Land Use Code* Chapter 23.84A and are applicable to this section:

ELECTRIC SIGN.

ON-PREMISES SIGN.

PROJECTING SIGN.

ROOF SIGN.

SIGN.

WALL SIGN.

[S] 3107.4 Permits.

3107.4.1 Permits required. Except as otherwise specifically provided in this section, a permit shall be obtained from the *building official* before any sign is erected, constructed, posted, applied, or altered.

A permit must be obtained for:

1. All signs viewable from public rights of way, except signs considered temporary signs by the *Land Use Code* Section 23.55.
2. All *electric signs*.
3. Existing sign when a different business entity seeks to use the sign.
4. Any *display surface* greater than 5 square feet (0.46 m^2) in area.
5. Signs located within the interior of the building that are not visible from the public right-of-way when:
   - 5.1. The sign is mounted within the interior of a covered or open mall of a multi-tenant retail facility and the sign is located over or adjoining the pedestrian walking surface; or
   - 5.2. The sign is greater than 5 square feet (0.46 m^2) in area; or
   - 5.3 It is an *electric sign*.
6. Existing signs that are removed and reinstalled.
7. Signs that are refurbished, retro-fitted, relocated or field-assembled.

3107.4.2 Work exempt from permit. A sign permit is not required for:

1. Changes made to the message copy installed on the *display surface* of a sign when the *sign structure* is lawfully erected and is specifically designed for using manually replaceable copy.

2. Maintenance which is limited to painting, repainting, cleaning and minor repairs where the *display surface* or *sign structure* is not removed or replaced.
3. Signs for public facilities that indicate danger or that provide service or safety information and are not greater than 24 square feet (2.23 square meters).

3107.4.3 Temporary signs. The erection, re-erection, construction, posting or placement of temporary signs that are allowed by Section 23.55.012 of the *Land Use Code* do not require a sign permit. The owner of a temporary sign is responsible for compliance with the provisions of this section and other applicable laws or codes regulating signs, and for the removal of any temporary sign at the end of the allowed term. Failure to comply with the requirements of either this *Code* or the *Land Use Code* is a violation and subject to the provisions of Section 103 of this *Code* and the provisions of Chapter 23.91 of the *Land Use Code.*

3107.4.4 Maximum number of signs. Temporary signs allowed by Section 23.55.012 of the *Land Use Code* and signs not requiring a permit as specified in Section 3107.4.1 of this *Code* are not counted as part of the maximum number of signs allowed under Chapter 23.55 of the *Land Use Code*.

3107.4.5 Attachments to signs. Ancillary devices, displays and attachments, that are not part of the original sign design for which a permit was issued, shall not be added to an existing sign except as provided Chapter 23.55 of the *Land Use Code* and requires a new permit issued by the *building official.*

Where ancillary devices, displays, *electric signs* or luminaires are attached to a *sign structure*, the additional load of all attachments shall be included in the design loads and shall comply with the requirements of Chapter 16 and Section 3107.10 of this *Code*.

[S] 3107.5 Permit application. To obtain a sign permit, the applicant shall submit an application to the Department which provides the following information:

1. The address of the proposed sign installation;
2. Specifications, plans and drawings of the structure, site and vicinity, and a numbering system that identifies the placement of each proposed sign on the elevation and plan view drawings;
3. Signature, contact information and City business license number of the building owner;
4. Signature, contact information and City business license number of the business establishment served by the sign or *awning sign*;
5. Signature, contact information, City business license number, and State contractor or electrical contractor license number of the installer;
6. Electrical connection and illumination information when the sign has electrical components; and
7. Permit fee as specified in the *Fee Subtitle*.

Note: Electrical permits are required for *electric signs* pursuant to the *Seattle Electrical Code*, and street use permits shall be obtained from the Department of Transportation for signs over any public place pursuant to the *Street Use Code*. Review and approval by the Department of Neighborhoods is required for signs located on the site of a *historic building*, or in a *landmark* or special review district.

[S] 3107.6 Inspections. All signs regulated by this chapter are subject to inspection by the *building official*, including sign footings, refurbished or relocated used signs and retrofitted and field-assembled signs. The permit holder must request a final inspection within 3 business days of completing the installation. The *building official* may require an inspection of any temporary sign to ensure public safety.

3107.6.1 Electrical sign inspection. All electrical wiring is subject to the *Seattle Electrical Code.* Upon energizing an *electrical sign*, the permit holder must request an inspection within one business day.

3107.6.2 Sign footing inspection. Footings for all signs greater than 5 square feet (0.46 m^2) in area require a footing inspection. An inspection must be requested and completed before the footing is filled.

[S] 3107.7 Maintenance and closure of business.

3107.7.1 Maintenance. The owners of signs shall maintain their signs, together with all supports, braces, guys and anchors, in good repair and in a proper state of preservation. The owners shall keep *display surfaces* of all signs neatly painted or posted at all times. Failure to maintain any sign, *display surface* or *sign structure* and the component parts is a violation and subject to the provisions of Section 103 of this *Code.*

3107.7.2 Closure of business and abandoned signs. Upon the closure and vacation of a business or activity, the operator of the business or activity is responsible for removing all related signs within 90 days from the date of closure. If the operator fails to remove any sign and the business or activity is not resumed during the 90-day period, then the owner of the

premises upon which the signs are located is responsible and must remove all signs within 180 days from the date of closure and vacation of the business or activity.

Note: A new permit is required for existing signs when a different business entity uses the sign. See Section 3107.4.

[S] 3107.8 Nonconforming signs. Maintenance to keep a nonconforming sign in good condition is required. Minor structural or electrical additions or alterations deemed to be necessary for public safety may be authorized by the *building official.* A nonconforming sign, for the purpose of this C*ode*, is a sign or any portion of a sign which, because of its location or construction, could not lawfully be reconstructed in its present location.

[S] 3107.9 General requirements.

3107.9.1 General. All signs shall conform to the requirements of this section.

3107.9.2 Clearance from overhead electrical conductors. Signs shall be located no closer than 3 feet (914 mm) horizontally or 8 feet (2438 mm) vertically from overhead electrical conductors which are energized at 1000 volts or less and not less than 10 feet (3048 mm) in any direction from overhead conductors energized at more than 1000 volts.

Exception: Overhead conductors enclosed in an approved raceway or enclosure.

3107.9.3 Clearance from fire escapes, exits or standpipes. No sign or *sign structure* shall be erected in such a manner that any portion of its surface or supports will interfere in any way with the free use of any fire escape, exit or standpipe.

3107.9.4 Obstruction of exits, light and ventilation. No portion of the surface or support of any sign shall be erected, constructed or maintained so as to obstruct any fire escape or standpipe, or any window, door or opening used as a *means of egress,* or so as to prevent free passage from one part of a roof to any other part of the roof. No sign, or portion of a sign, shall be attached in any form, shape or manner to a fire escape or standpipe, nor be placed in such a manner as to interfere with any opening providing the ventilation or light required by Chapter 12 of this *Code*.

3107.9.5 Supporting members. Signs mounted on and attached to buildings shall be so designed and mounted that secondary structural members shall be incorporated into and become a part of the sign display. Exterior bracing such as angle irons, guy wires, cables and similar devices are permitted only where no other reasonable method of fastening consistent with safety is possible.

3107.9.6 Non-display surfaces. If a sign is visible from more than one direction, all areas not intended as a *display surface* including the back and sides, shall be designed so the non-*display surfaces* are given a finished appearance and the *display surface* is visible only from the direction that it is intended to be seen.

3107.9.7 Electrical permit sticker. Each *electrical sign* shall display the electrical permit sticker issued with the sign permit. The sticker shall be located where it is clearly visible without use of a ladder and without requiring access into a building, unless otherwise authorized by the *building official*.

3107.9.8 Labels. Every permanent sign shall display the name of the sign erector or manufacturer. Electrical signs must display listing labels required by the *Seattle Electrical Code*.

[S] 3107.10 Design.

3107.10.1 General. Signs and *sign structures* shall be designed and constructed to resist all forces to which they are subject as specified in Chapter 16 and this section. All signs shall be designed and installed to transfer all forces directly to the structural frame of the building or structure. The overturning moment produced from lateral forces shall in no case exceed two-thirds of the dead load resisting moment. Uplifts due to overturning shall be adequately resisted by proper anchorage to the ground or to the structural frame of the building. The weight of earth superimposed over footings is permitted to be used in determining the dead load resisting moment. Such earth shall be carefully placed and thoroughly compacted.

3107.10.2 Wind and seismic loads. Signs and *sign structures* shall be designed and constructed to resist wind and seismic forces as specified in Chapter 16 of this *Code*.

3107.10.3 Allowable stresses. The design of wood, concrete, steel or aluminum members shall conform to the requirements of Chapters 19, 20, 22 and 23. Loads, both vertical and horizontal, exerted on the soil shall not produce stresses exceeding those specified in Chapter 16 of this *Code*. The working stresses of wire rope and its fastenings shall not exceed 25 percent of the ultimate strength of the rope or fasteners.

[S] 3107.11 Construction.

3107.11.1 General. The supports for all signs and *sign structures* shall be placed in or upon private property and shall be securely built, constructed, and erected in conformance with the requirements of this chapter. All structural welding on signs and *sign structures* shall conform to the requirements of Chapter 20 for aluminum and Chapter 22 for steel.

3107.11.2 Materials. Materials for construction of signs and *sign structures* shall be:

1. Of a quality and grade allowed by specific chapters in this *Code* for the materials proposed; or
2. Listed or rated for the proposed *use*; or

3. Approved by the *building official*.

3107.11.3 Approved materials. The *building official* may require that sufficient technical data be submitted to substantiate the proposed *use* of any material; and may approve *use* of the material when the *building official* determines that the evidence submitted is satisfactory for the intended *use*.

3107.11.4 Anchorage. Members supporting unbraced signs shall be so proportioned that the bearing loads imposed on the soil in either direction, horizontal or vertical, shall not exceed the design requirements.

Braced ground signs shall be anchored to resist the specified wind or seismic load acting in any direction. Anchors and supports shall be designed for safe bearing loads on the soil and for an effective resistance to pull-out amounting to a force 25 percent greater than the required resistance to overturning.

Signs attached to masonry, concrete or steel shall be safely and securely fastened thereto by means of metal anchors, bolts or approved expansion screws of sufficient size and anchorage to support safely the loads applied. No wooden blocks or plugs or anchors with wood used in connection with screws or nails is considered proper anchorage except in the case of signs attached to wood framing.

No lead plugs or anchors shall be used to support signs. No anchor or support of any sign shall be connected to or supported by an unbraced parapet wall unless the wall is designed or braced for the added forces.

[S] 3107.12 Roof signs.

3107.12.1 General. *Roof signs* shall be constructed of approved material as specified in Section 3107.11. The sign shall be secured and anchored to the structural frame of the building.

3107.12.2 Clear passage. A passage clear of all obstructions shall be left under or around, and immediately adjacent to, signs exceeding a height of 4 feet (1219 mm) above the roof. The passage shall not be less than 3 feet (914 mm) wide and 4 feet (1219 mm) high and shall be at parapet or roof level. There shall be one clear passage opening as follows:

1. One for each *roof sign*.
2. One for every 50 lineal feet (15 240 mm) of horizontally running *sign structure*.
3. Within 20 feet (6096 mm) of walls and parapets when *roof signs* are at right angles to a face of the building.

[S] 3107.13 Electrical signs.

3107.13.1 Construction. Structures supporting *electrical signs* shall comply with Section 3107.11 of this *Code*.

3107.13.2 Installation. Electrical signs and branch circuits supplying power to *electric signs* shall be installed in accordance with the Article 600 of the *Seattle Electrical Code*.

3107.13.3 Inspections. The permit holder must request a final inspection within 3 business days of completing the installation or within one business day upon energizing an *electrical sign*.

SECTION 3108
TELECOMMUNICATION AND BROADCAST TOWERS

[BS] 3108.1 General. Towers shall be designed and constructed in accordance with the provisions of TIA 222. Towers shall be designed for seismic *loads*; exceptions related to seismic design listed in Section 2.7.3 of TIA 222 shall not apply. In Section 2.6.6.2 of TIA 222, the horizontal extent of Topographic Category 2, escarpments, shall be 16 times the height of the escarpment.

Exception: Single free-standing poles used to support antennas not greater than 75 feet (22 860 mm), measured from the top of the pole to grade, shall not be required to be noncombustible.

[BS] 3108.2 Location and access. Towers shall be located such that guy wires and other accessories shall not cross or encroach on any street or other public space, or over above-ground electric utility lines, or encroach on any privately owned property without the written consent of the owner of the encroached-upon property, space or above-ground electric utility lines. Towers shall be equipped with climbing and working facilities in compliance with TIA 222. Access to the tower sites shall be limited as required by applicable OSHA, FCC and EPA regulations.

SECTION 3109
SWIMMING POOLS, SPAS AND HOT TUBS

[W] 3109.1 General. The design and construction of swimming pools, spas and ((~~hot tubs~~)) other aquatic recreation facilities shall comply with the *International Swimming Pool and Spa Code*, ((~~.~~)) where the facility is one of the following:

1. For the sole use of residents and invited guests at a single-family *dwelling*;
2. For the sole use of residents and invited guests of a duplex owned by the residents;

3. Operated exclusively for physical therapy or rehabilitation and under the supervision of licensed medical practitioner.

All other "water recreation facilities" as defined in RCW 70.90.110 are regulated under chapters 246-260 and 246-262 WAC.

SECTION 3110
AUTOMATIC VEHICULAR GATES

3110.1 General. *Automatic vehicular gates* shall comply with the requirements of Sections 3110.2 and 3110.3 and other applicable sections of this code.

3110.2 Vehicular gates intended for automation. *Vehicular gates* intended for automation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

3110.3 Vehicular gate openers. *Vehicular gate* openers, where provided, shall be *listed* in accordance with UL 325.

SECTION 3111
SOLAR ENERGY SYSTEMS

3111.1 General. Solar energy systems shall comply with the requirements of this section.

3111.1.1 Wind resistance. Rooftop-mounted photovoltaic (PV) panel systems and solar thermal collectors shall be designed in accordance with Section 1609.

3111.1.2 Roof live load. Roof structures that provide support for solar energy systems shall be designed in accordance with Section 1607.14.4.

3111.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with this section, the *International Plumbing Code*, the *International Mechanical Code* and the *International Fire Code*. Where light-transmitting plastic covers are used, solar thermal collectors shall be designed in accordance with Section 2606.12.

3111.2.1 Equipment. Solar thermal systems and components shall be *listed* and *labeled* in accordance with ICC 900/SRCC 300 and ICC 901/SRCC 100.

3111.3 Photovoltaic solar energy systems. Photovoltaic solar energy systems shall be designed and installed in accordance with this section, the *International Fire Code*, NFPA 70 and the manufacturer's installation instructions.

3111.3.1 Equipment. *Photovoltaic panels* and modules shall be *listed* and *labeled* in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

3111.3.2 Fire classification. Rooftop-mounted photovoltaic (PV) panel systems shall have a fire classification in accordance with Section 1505.9. Building-integrated photovoltaic (BIPV) systems installed as roof coverings shall have a fire classification in accordance with Section 1505.8.

3111.3.3 Building-integrated photovoltaic (BIPV) systems. BIPV systems installed as roof coverings shall be designed and installed in accordance with Section 1507.

3111.3.4 Access and pathways. Roof access, pathways and spacing requirements shall be provided in accordance with Section 1205 of the *International Fire Code*.

3111.3.5 Ground-mounted photovoltaic systems. Ground-mounted photovoltaic systems shall be designed and installed in accordance with Chapter 16 and the *International Fire Code*.

3111.3.5.1 Fire separation distances. Ground-mounted photovoltaic systems shall be subject to the *fire separation distance* requirements determined by the local jurisdiction.

SECTION 3112
GREENHOUSES

3112.1 General. The provisions of this section shall apply to *greenhouses* that are designed and used for the cultivation, maintenance, or protection of plants.

3112.2 Accessibility. *Greenhouses* shall be *accessible* in accordance with Chapter 11.

3112.3 Structural design. *Greenhouses* shall comply with the structural design requirements for *greenhouses* in Chapter 16.

3112.4 Glass and glazing. Glass and glazing used in *greenhouses* shall comply with Section 2405.

3112.5 Light-transmitting plastics. Light-transmitting plastics shall be permitted in lieu of plain glass in *greenhouses* and shall comply with Section 2606.

3112.6 Membrane structures. *Greenhouses* that are membrane structures shall comply with Section 3102.

3112.6.1 Plastic film. Plastic films used in *greenhouses* shall comply with Section 3102.3.

SECTION 3113
RELOCATABLE BUILDINGS

3113.1 General. The provisions of this section shall apply to relocatable buildings. Relocatable buildings manufactured after the effective date of this code shall comply with the applicable provisions of this code.

Exception: This section shall not apply to manufactured housing used as dwellings.

[S] 3113.1.1 Compliance. A newly constructed relocatable building shall comply with the requirements of this code for new construction. An existing relocatable building that is undergoing alteration, addition, change of occupancy or relocation shall comply with ((~~Chapter 14 of the *International Existing Building Code*~~)) Section 313 of the *Seattle Existing Building Code*.

3113.2 Supplemental information. Supplemental information specific to a relocatable building shall be submitted to the authority having jurisdiction. It shall, as a minimum, include the following in addition to the information required by Section 105:

1. Manufacturer's name and address.
2. Date of manufacture.
3. Serial number of module.
4. Manufacturer's design drawings.
5. Type of construction in accordance with Section 602.
6. Design *loads* including: *roof live load*, roof snow *load*, floor *live load*, wind *load* and seismic *site class*, use group and design category.
7. Additional building planning and structural design data.
8. Site-built structure or appurtenance attached to the relocatable building.

3113.3 Manufacturer's data plate. Each relocatable module shall have a data plate that is permanently attached on or adjacent to the electrical panel, and shall include the following information:

1. Occupancy group.
2. Manufacturer's name and address.
3. Date of manufacture.
4. Serial number of module.
5. Design *roof live load*, design floor *live load*, snow *load*, wind and seismic design.
6. *Approved* quality assurance agency or *approved* inspection agency.
7. Codes and standards of construction.
8. Envelope thermal resistance values.
9. Electrical service size.
10. Fuel-burning equipment and size.
11. Special limitations if any.

3113.4 Inspection agencies. The building official is authorized to accept reports of inspections conducted by *approved* inspection agencies during off-site construction of the relocatable building, and to satisfy the applicable requirements of Sections 110.3 through 110.3.12.1.

SECTION 3114
PUBLIC USE RESTROOM BUILDINGS IN FLOOD HAZARD AREAS

Note: Additional Seattle-specific requirements for buildings and structures in the flood hazard area may apply. See Section 106.4, Flood hazard areas, for additional information.

3114.1 General. For the purpose of this section, public restroom buildings are located on publicly owned lands in *flood hazard areas* and intended for public use. Public restroom buildings and portions of other buildings that contain public restrooms are limited to toilet rooms, bathrooms, showers and changing rooms. Public restroom buildings and portions of buildings that

contain public restrooms shall comply with the requirements of this section. Public-use restrooms that are not elevated or *dry floodproofed* in accordance with Section 1612 shall comply with Section 3114.2. Portions of buildings that include uses other than public-use toilet rooms, bathrooms, showers and changing rooms shall comply with Section 1612.

3114.2 Flood resistance. Public-use restrooms on publicly owned lands in *flood hazard areas* shall comply with the requirements of ASCE 24, except for elevation requirements, and shall comply with all of the following criteria:

1. The building footprint is not more than 1,500 square feet (139 m^2).
2. Located, designed and constructed to resist the effects of flood hazards and flood loads to minimize flood damage from a combination of wind and water loads associated with the base flood.
3. Anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy during conditions of the base flood.
4. Constructed of flood-damage-resistant materials.
5. Where enclosed by walls, the walls have flood openings.
6. Mechanical and electrical systems are located above the base flood elevation.
7. Plumbing fixtures and plumbing connections are located above the base flood elevation.
8. An emergency plan, approved by the jurisdiction, is submitted to the building official and includes building design documents specifying implementation of protection measures prior to the onset of flooding conditions.

Exceptions:

1. Minimum necessary electric equipment required to address health, life safety and electric code requirements is permitted below the base flood elevation in accordance with ASCE 24 provisions for electric elements installed below the minimum elevations.
2. Plumbing fixtures and connections are permitted below the base flood elevation provided that the fixtures and connections are designed and installed to minimize or eliminate infiltration of floodwaters into the sanitary sewage system and discharges from sanitary sewage systems into floodwaters.

SECTION 3115
INTERMODAL SHIPPING CONTAINERS

3115.1 General. The provisions of Section 3115 and other applicable sections of this code shall apply to *intermodal shipping containers* that are repurposed for use as buildings or structures, or as a part of buildings or structures.

Exceptions:

1. Intermodal shipping containers previously approved as existing relocatable buildings complying with ((~~Chapter 14 of the International Existing Building Code~~)) Section 313 of the *Seattle Existing Building Code*.
2. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.
3. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.
4. Intermodal shipping containers housing or supporting experimental equipment are exempt from the requirements of Section 3115, provided that they comply with all of the following:
    4.1. Such units shall be single stand-alone units supported at grade level and used only for occupancies as specified under Risk Category I in Table 1604.5.
    4.2. Such units are located a minimum of 8 feet (2438 mm) from adjacent structures, and are not connected to a fuel gas system or fuel gas utility.
    4.3. In hurricane-prone regions and flood hazard areas, such units are designed in accordance with the applicable provisions of Chapter 16.

3115.2 Construction documents. The construction documents shall contain information to verify the dimensions and establish the physical properties of the steel components and wood floor components of the *intermodal shipping container,* in addition to the information required by Sections 107 and 1603.

3115.3 Intermodal shipping container information. Intermodal shipping containers shall bear an existing data plate containing the following information as required by ISO 6346 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.

1. Manufacturer's name or identification number.
2. Date manufactured.

3. Safety approval number.
4. Identification number.
5. Maximum operating gross mass or weight (kg) (lbs).
6. Allowable stacking load for 1.8G (kg) (lbs).
7. Transverse racking test force (Newtons).
8. Valid maintenance examination date.

Where approved by the *building official*, the markings and existing data plate are permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.

3115.4 Protection against decay and termites. Wood structural floors of *intermodal shipping containers* shall be protected from decay and termites in accordance with the applicable provisions of Section 2304.12.1.1.

3115.5 Under-floor ventilation. The space between the bottom of the floor joists and the earth under any *intermodal shipping container*, except spaces occupied by basements and cellars, shall be provided with ventilation in accordance with Section 1202.4.

3115.6 Roof assemblies. *Intermodal shipping container* roof assemblies shall comply with the applicable requirements of Chapter 15.

Exception: Single-unit, stand-alone intermodal shipping containers not attached to, or stacked vertically over, other intermodal shipping containers, buildings or structures.

3115.7 Joints and voids. Joints and voids that create concealed spaces between connected or stacked *intermodal shipping containers* at fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved *fire-resistant joint system* in accordance with Section 715.

3115.8 Structural. Intermodal shipping containers that conform to ISO 1496-1 and are repurposed for use as buildings or structures, or as a part of buildings or structures, shall be designed in accordance with Chapter 16 and this section.

3115.8.1 Foundations. *Intermodal shipping containers* repurposed for use as a permanent building or structure shall be supported on foundations or other supporting structures designed and constructed in accordance with Chapters 16 through 23.

3115.8.1.1 Anchorage. *Intermodal shipping containers* shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path for all applicable design and environmental *loads* in accordance with Chapter 16.

3115.8.2 Welds. New welds and connections shall be equal to or greater than the original connections.

3115.8.3 Structural design. The structural design for the *intermodal shipping containers* repurposed for use as a building or structure, or as part of a building or structure, shall comply with Section 3115.8.4 or 3115.8.5.

3115.8.4 Detailed design procedure. A structural analysis meeting the requirements of this section shall be provided to the *building official* to demonstrate the structural adequacy of the intermodal shipping containers.

Exception: Intermodal shipping containers designed in accordance with Section 3115.8.5.

3115.8.4.1 Material properties. Structural material properties for existing intermodal shipping container steel components shall be established by material testing where the steel grade and composition cannot be identified by the manufacturer's designation as to manufacture and mill test.

3115.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7, Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials.
2. Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7, Table 12.2-1.
3. Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

3115.8.4.3 Allowable shear value. The allowable shear values for the *intermodal shipping container* corrugated steel sheet panel side walls and end walls shall be demonstrated by testing and analysis in accordance with Section 104.11. Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

3115.8.5 Simplified structural design of single-unit containers. Single-unit *intermodal shipping containers* conforming to the limitations of Section 3115.8.5.1 shall be permitted to be designed in accordance with the simplified structural design provisions of Section 3115.8.5.2.

3115.8.5.1 Limitations. The use of Section 3115.8.5 is subject to the following limitations:

1. The *intermodal shipping container* shall be a single-unit, stand-alone unit supported on a foundation and shall not be in contact with or supporting any other shipping container or other structure.
2. The *intermodal shipping container* top and bottom rails, corner castings, and columns or any portion thereof shall not be notched, cut, or removed in any manner.
3. The *intermodal shipping container* shall be erected in a level and horizontal position with the floor located at the bottom.
4. The *intermodal shipping container* shall be located in Seismic Design Category A, B, C or D.

3115.8.5.2 Simplified structural design. Where permitted by Section 3115.8.5.1, single-unit, stand-alone intermodal shipping containers shall be designed using the following assumptions for the corrugated steel shear walls:

1. The appropriate detailing requirements contained in Chapters 16 through 23.
2. Response modification coefficient, R = 2.
3. Overstrength factor, $\Omega_0 = 2.5$.
4. Deflection amplification factor, $C_d = 2$.
5. Limits on structural height, $h_n = 9.5$ feet (2900 mm).

3115.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section 3115.8.5.2 shall be in accordance with Table 3115.8.5.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure 3115.8.5.3(1).
2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3115.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3115.8.5.3(3).
4. Where openings are made in container walls, floors or roofs, for doors, windows and other openings:
    4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.
    4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.
5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing intermodal shipping container vents shall not be considered a penetration, as shown in Figure 3115.8.5.3(4).
6. End wall doors designated as part of the lateral force-resisting system shall be welded closed.

TABLE 3115.8.5.3
ALLOWABLE SHEAR VALUES FOR INTERMODAL
SHIPPING CONTAINER CORRUGATED STEEL WALLS FOR WIND OR SEISMIC LOADING

CONTAINER DESIGNATION[b]	CONTAINER DIMENSION (nominal length)	CONTAINER DIMENSION (nominal height)	ALLOWABLE SHEAR VALUES (PLF)[a, c]	
			Side Wall	End Wall
1EEE	45 feet	9.5 feet	75	843
1EE		8.5 feet		
1AAA	40 feet	9.5 feet	84	
1AA		8.5 feet		
1A		8.0 feet		
1AX		< 8.0 feet		
1BBB	30 feet	9.5 feet	112	
1BB		8.5 feet		
1B		8.0 feet		
1BX		< 8.0 feet		
1CC	20 feet	8.5 feet	168	
1C		8.0 feet		
1CX		< 8.0 feet		
1D	10 feet	8.0 feet	337	
1DX		< 8.0 feet		

For SI: 1 foot = 304.8 mm.

a. The allowable strength shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.

b. Container designation type is derived from ISO 668.

c. Limitations of Section 3115.8.5.1 shall apply.

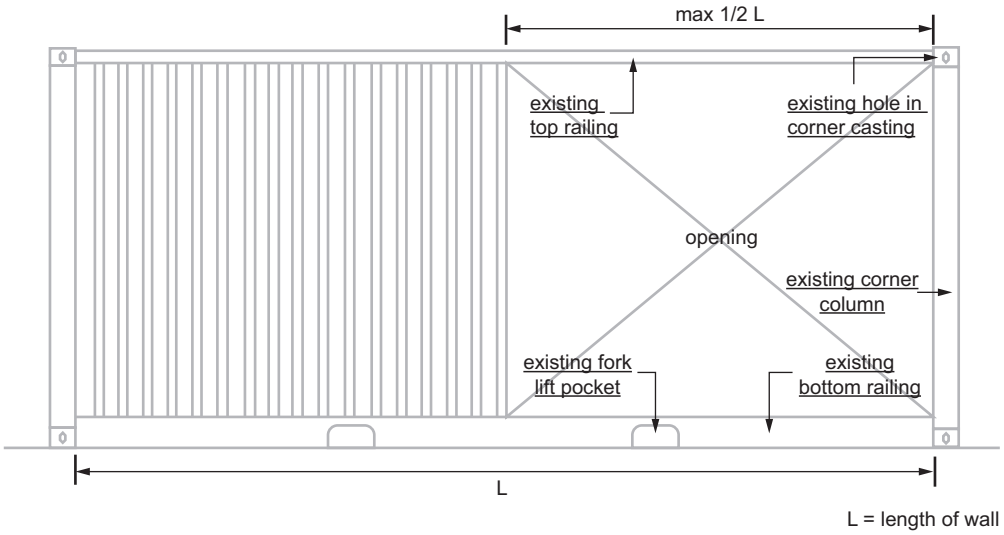
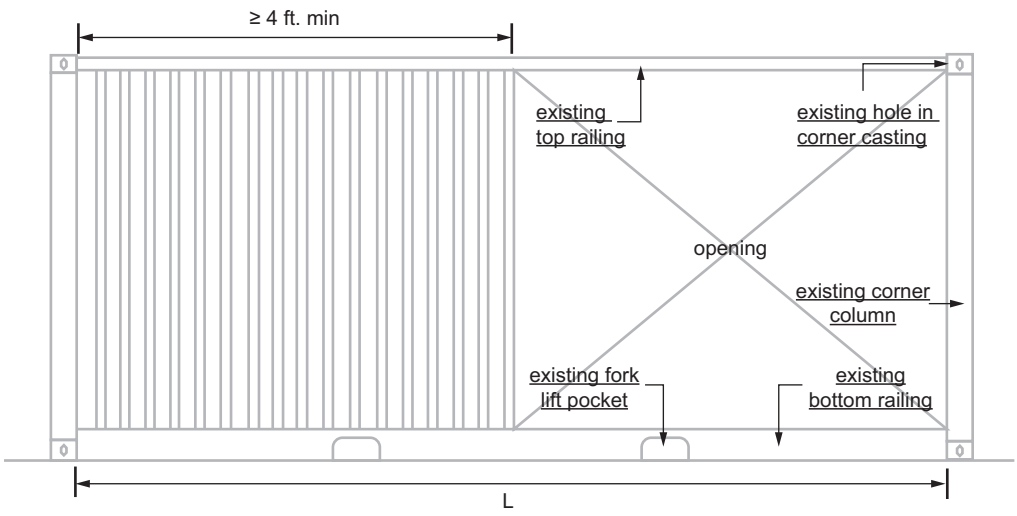


FIGURE 3115.8.5.3(1)
BRACING UNIT DISTRIBUTION—MAXIMUM LINEAR LENGTH



For SI: 1 foot = 304.8 mm.

FIGURE 3115.8.5.3(2)
BRACING UNIT DISTRIBUTION—MINIMUM LINEAR LENGTH

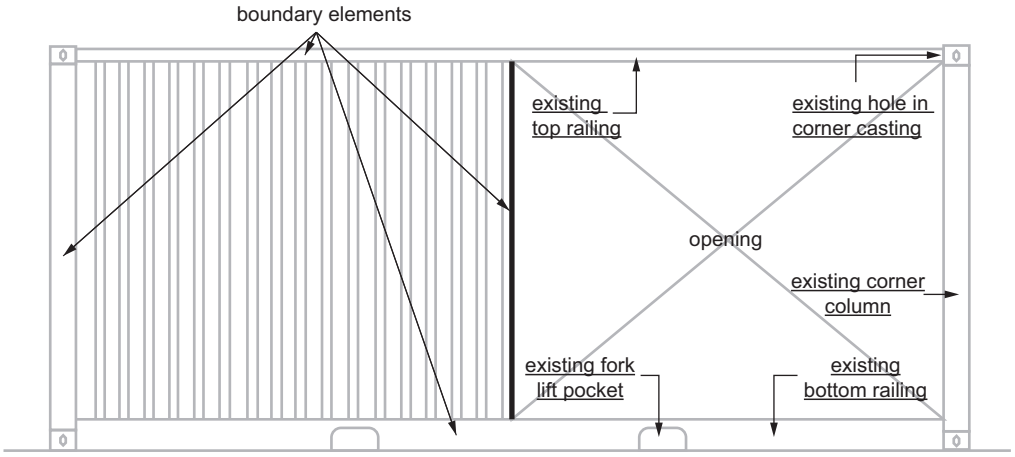
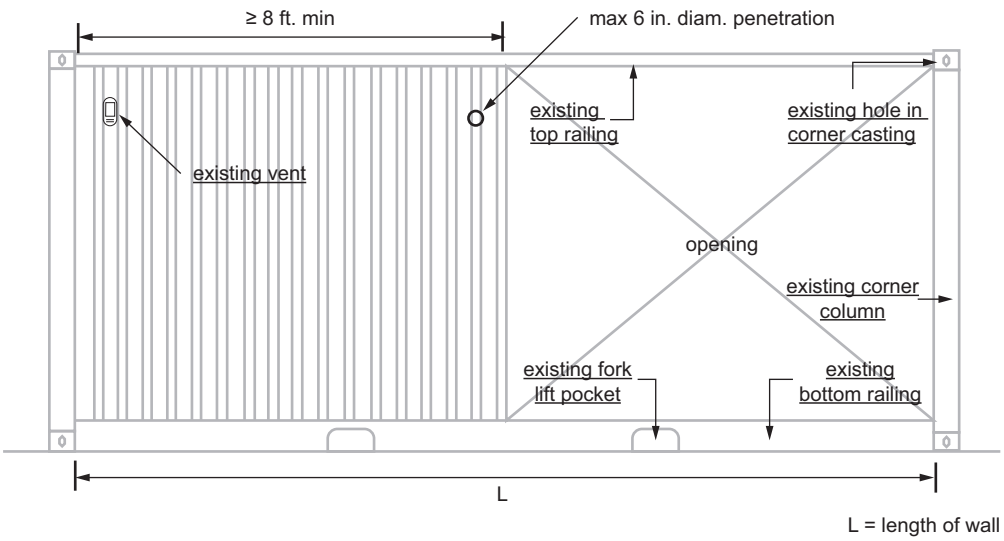


FIGURE 3115.8.5.3(3)
BRACING UNIT DISTRIBUTION—BOUNDARY ELEMENTS



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 3115.8.5.3(4)
BRACING UNIT DISTRIBUTION—PENETRATION LIMITATIONS

[W] SECTION 3116
FIXED GUIDEWAY TRANSIT AND PASSENGER RAIL SYSTEMS

[W] 3116.1. Construction. Construction of fixed guideway transit and passenger rail systems shall be in accordance with NFPA 130-2020, standard for fixed transit and passenger rail systems, as modified in Section 3116.2.

[W] 3116.2 Modifications to NFPA 130.

Note: An asterisk is used throughout Section 3116 to reference material provided in the annex of NFPA 130-2020, Standard for Fixed Transit and Passenger Rail Systems. This information not part of the adopted code.

[W] 3.3 General Definitions.

3.3.44.2 Traction power substation (TPSS): A TPSS is an electrical substation consisting of switchgear transformers/rectifiers. Emergency trip equipment, and other systems that converts AC electric power provided by the electrical power industry for public utility service to DC voltage to supply light rail vehicles with traction current.

[S] 4.4 Fire Scenarios.

4.4.1.1 Emergency power assumptions. The emergency power requirements in this standard assume a fire or other emergency event within the station or trainway concurrent with a power outage of the primary source of electrical power unrelated to the event within the transit system.

[S] 5.1 General.

5.1.2.3 Fixed guideway transit and passenger rail stations shall comply with the applicable provisions of Section 1114.

5.1.3.1.1 Fixed guideway transit and passenger rail stations are classified as Group A, Division 3 occupancies in accordance with the 2021 Seattle Building Code and 2021 Seattle Fire Code.

[W][S] 5.2 Construction.

5.2.1.1 During the course of construction, provisions of NFPA 241 and Chapter 33 of the 2021 Seattle Fire Code and Chapter 33 of the 2021 Seattle Building Code ((~~shall~~)) apply. ((~~except as modified herein.~~))

5.2.2.2 Construction types shall conform to the requirements in ((~~NFPA 220~~)) International Building Code, Chapter 6, unless otherwise exempted in this ((~~standard~~)) section.

[W] Table 5.2.2.1
Minimum Construction Requirements for New Station Structures

Station Configuration	Construction Type†
Stations Erected entirely above grade and in a separate building:	
Open stations	Type IIB
Enclosed stations	Type IIA
Stations erected entirely or partially below grade:	
Open above grade portions of below grade structures*	Type IIA
Below grade portions of structures	Type IB
Below grade structures with occupant loads exceeding 1000	Type IA

* Roofs not supporting an occupancy above are not required to have a fire resistance rating.

† Construction types are in accordance with ((~~NFPA 220~~)) the International Building Code.

5.2.4.1 Interconnected Floor Levels. Interconnection between floor levels in stations shall be permitted as follows:

(1) *Stairs and escalators regularly used by passengers for circulation during normal revenue service in enclosed stations equipped throughout with an automatic sprinkler system ((~~shall not be~~)) are not required to be fire-separated if the station is constructed in accordance with Chapter 7 of the 2021 *Seattle Building Code*. All required exit stairs in enclosed stations shall be enclosed in accordance with Chapter 10 of the 2021 *Seattle Building Code*.

(2) Public areas on different levels in open stations are permitted to be interconnected.

(3) Public areas on different levels in enclosed stations shall be permitted to be interconnected, provided fire separation is not required for smoke control or other fire protection purposes.

5.2.4.2* Separation Between Public and Nonpublic Floor Areas. All public areas shall be fire-separated from adjacent nonpublic areas by 5.2.4.3 through 5.2.4.5.

5.2.4.3 Ancillary Spaces. Fire resistance ratings of separations between ancillary occupancies shall be established as required for accessory occupancies and incidental uses by ((~~NFPA 101~~)) the International Building Code and in accordance with ASTM E119 and ANSI/UL 263.

5.2.5.4 Materials used as interior finish in open stations shall comply with the requirements of ((~~NFPA 101, Chapter 12~~)) International Building Code, Chapter 8.

[W][S] 5.3 Means of Egress.

5.3.1.1 The provisions for means of egress for a station shall comply with ((~~Chapters 7 and 12 of NFPA 101~~)) the International Building Code, Chapter 10, except as herein modified.

5.3.2.1* The occupant load for a station shall be based on the train load of trains simultaneously entering the station on all tracks in normal traffic direction plus the simultaneous entraining load awaiting trains. For below grade (including retained cut) stations, the calculated *occupant load* derived from the analysis above cannot be less than the *occupant load* based upon one occupant per 7 sq. ft. (net) applied to the platforms.

(1) The train load shall consider only one train at any one track, inside a station.

(2) The basis for calculating train and entraining loads shall be the peak period ridership figures as projected for design of a new system or as updated for an operating system

5.3.2.2.1 Where station occupancy is anticipated to be greater than design capacity during a major event the operating agency shall initiate approved measures to restrict access to the station, when required by the *fire code official*, to ensure existing *means of egress* are adequate as an alternate to account for peak ridership associated with major events.

5.3.2.4 ((~~Where~~)) If an area within a station is intended for use by other than passengers or employees, the following parameters shall apply:

(1) The occupant load for that area shall be determined in accordance with the provisions of ((~~NFPA 101~~)) the *International Building Code* as appropriate for the use.

(2) The additional occupant load shall be included in determining the required egress from that area.

(3) The additional occupant load shall be permitted to be omitted from the station occupant load where the area has independent means of egress of sufficient number and capacity.

5.3.3.4 Travel Distance. For open stations ((~~The~~)) the maximum travel distance on the platform to a point at which a means of egress route leaves the platform shall not exceed 100 m (325 ft). For enclosed stations the travel distance to an exit shall not exceed 76 m (250 ft.).

5.3.3.6 Alternate Egress. At least two means of egress remote from each other shall be provided from each station platform as follows:

(((~~(1)* A means of egress used as a public circulation route shall be permitted to provide more than 50 percent of the required egress capacity from a station platform or other location.~~

~~2~~)) (1) Means of egress from separate platforms shall be permitted to converge.

(((~~(3)~~))) (2) Where means of egress routes from separate platforms converge, the subsequent capacity of the egress route shall be sufficient to maintain the required evacuation time from the incident platform.

5.3.3.8 Required *interior exit stairways* in enclosed stations serving floor levels more than 30 feet (9144 mm) below its *level of exit discharge*, except those regularly used by passengers shall comply with the requirements for a pressurized stairway in Section 909.20.5 of the 2021 *Seattle Building Code*.

5.3.5.4. Not adopted.

5.3.5.5. Not adopted.

5.3.5.6. Not adopted.

5.3.5.7. Not adopted.

5.3.5.8. Not adopted.

5.3.5.9. Not adopted.

5.3.5.10. Not adopted.

5.3.6 Elevators. Not adopted.

5.3.7* Doors, Gates, Security Grilles and Exit Hatches.

5.3.7.1 The egress capacity for doors and gates in a means of egress serving public areas shall be computed as follows:

(1) ((~~60~~)) Sixty people per minute (p/min) for single leaf doors and gates

(2)* 0.0819 p/mm-min (2.08 p/in.-min) for bi-parting multileaf doors and gates measured for the clear width dimension.

5.3.7.2 Gates in a means of egress shall be designed in accordance with the requirements for doors serving as a means of egress in accordance with Section 1010.3.4.1 of the 2021 *Seattle Building Code* and maintain the clear width of the exit walkway.

5.3.7.2.1 Security grilles are allowed when designed and operated in accordance with the IBC.

5.3.8 Fair Barriers.

5.3.8.5 Turnstile-type fare barriers shall be permitted in accordance with ((~~NFPA *101*~~)) Chapter 10 of the 2021 *Seattle Building Code* and shall be permitted in the means of egress and shall meet the following criteria:

(1) Dimensions shall be in accordance with the requirements of ((~~NFPA *101*~~)) Chapter 10 of the 2021 *Seattle Building Code*.

(2) Turnstiles that drop away from the egress opening under the conditions listed in 5.3.8.2 or 5.3.8.3 shall be credited with a capacity of 50 p/min for egress calculations.

(3) Turnstiles that revolve freely in the direction of egress under the conditions listed in 5.3.8.2 shall meet the following criteria:

(a) Each unit shall be credited with a capacity of 25 p/min for egress calculations.

(b) The turnstiles shall not account for more than 50 percent of the required egress capacity for each egress route.

[5.3.9* Horizontal Exits. Horizontal exits ((~~compliant with NFPA 101~~)) shall ((~~be permitted for up to 100 percent of the number of exits and require egress capacity provided that not more than 50 percent of the number and required capacity is into a single building~~)) comply with *International Building Code* Section 1026.

5.3.11 Means of Egress Lighting.

5.3.11.1 Illumination of the means of egress in stations, including escalators that are considered a means of egress, shall be in accordance with ((~~Section 7.8 of NFPA 101~~)) International Building Code Section 1008.

5.3.11.2 Means of egress, including escalators considered as means of egress, shall be provided with a system of emergency lighting in accordance with ((~~Section 7.9 of NFPA 101~~)) International Building Code Section 1008.

[W][S] 5.4 Fire Protection

5.4.1* Fire Command Center.

5.4.1.1 Enclosed stations shall be provided with a fire command center in accordance with NFPA 72 and Section 508 of the 2021 *Seattle Fire Code*.

5.4.2 Fire Alarm Systems

5.4.2.5 When activated, fire alarm, smoke detection, valve switches, and waterflow signals shall be transmitted simultaneously to the local station and to the operations control center. (See also Chapter 10). An operations Control Center per 9.6 shall be used to supervise these systems and devices.

5.4.4 Automatic Fire Suppression Systems.

5.4.4.1* An automatic sprinkler ((~~protection~~)) system shall be provided ((~~in areas used for concessions, in storage areas, in trash rooms, and other similar areas with combustible loadings, except trainways~~)) throughout enclosed stations.

Exceptions:

1. Traction power substation (TPSS) when located in a transformer vault designed in accordance with the NFPA 70.
2. Other high voltage equipment located in a transformer vault designed in accordance with the NFPA 70 when approved by the *fire code official*.
3. *Fire command centers*, unoccupied communication room(s), and unoccupied signal rooms when protected with *clean agent* fire suppression and separated from other spaces with two-hour fire rated construction.
4. Other rooms, critical to station operation, when protected with alternative automatic fire-extinguishing systems and separated from other spaces with two-hour fire rated construction, when approved by the fire code official.

5.4.4.1.1 An *automatic sprinkler system* shall be provided in areas of open stations used for concessions, markets, storage areas and similar areas with combustible loadings, and in trash rooms, electrical rooms, mechanical rooms, machinery rooms, communication rooms, and other enclosed rooms.

Exceptions:

1. Stations at grade with less than 1,500 sq. ft. of ancillary area/ancillary space.
2. *Fire command centers*, unoccupied communication room(s), and unoccupied signal rooms when protected with alternative *automatic fire-extinguishing systems* and separated from other spaces with two-hour fire rated construction.
3. Other rooms, critical to station operation, when protected with *clean agent* fire suppression and separated from other spaces with two-hour fire rated construction, when *approved* by the *code official*.

5.4.4.2 Sprinkler protection shall be permitted to be omitted in areas of open stations ((~~remotely located from public spaces~~)) separated from the station by a distance of 20 feet, where allowed by the *fire code official*.

5.4.4.5 Other fire suppression systems, if approved, shall be permitted to be substituted for automatic sprinkler systems in the areas listed in 5.4.4.1 and 5.4.4.1.1.

5.4.5 Standpipe and Hose Systems.

5.4.5.1* Class I standpipes shall be installed in enclosed stations in accordance with ((~~NFPA 14~~)) *International Fire Code* Section 905 except as modified herein and any other area as required by the *fire code official*.

5.4.5.3.1 Hydraulic design information signs shall be provided at each fire department connection indicating the residual inlet pumping pressure(s) required for the hydraulically most remote and/or other selected hose connection outlet location(s).

5.4.5.4 Standpipes shall be permitted to be of the dry type with the approval of the authority having jurisdiction provided the following requirements are met:

1. Systems shall be installed in a manner so that the water is delivered to all hose connections on the system in 10 minutes or less.
2. Combination air relief-vacuum valves shall be installed at each high point in the system.

   Exception: Combination air relief-vacuum valves are not required at fire department connections located at a high point of the system.

5.4.5.8 The standpipe system shall be designed to provide 1000 gpm at 130 psi. The 1000 gpm consists of the two most remote hose connections flowing 500 gpm each.

5.4.5.9 Isolation valves on the standpipe are permitted to be locked in the open position in lieu of being electronically monitored.

5.4.5.10 Pressure regulating devices are not required per Section 7.2.3.2 of NFPA 14.

5.4.6 Portable Fire Extinguishers. Portable fire extinguishers in such number, size, type, and location ((~~as determined by the authority having jurisdiction~~)) shall be provided in accordance with the *International Fire Code* Section 906.

5.4.6.1 Where required, portable fire extinguishers shall be selected, installed, inspected, tested, and maintained in accordance with NFPA 10. Portable fire extinguishers are not required in public areas of at-grade stations.

5.4.7 Ventilation.

5.4.7.1 Emergency ventilation shall be provided in enclosed stations in accordance with Chapter 7 and the *International Building Code* Section 909.

5.4.7.1.1 Smoke control system. A smoke control system shall be provided in underground fixed guideway transit and passenger rail stations in accordance with Section 909 of the 2021 *Seattle Building Code*. Smoke control shall restrict movement of smoke to the general area of fire origin and non-occupied exhaust areas and maintain tenability in the means of egress.

5.4.8 Emergency Power Supply System (EPSS)

5.4.8.1 ((~~Emergency power~~)) A Class 2, Type U or 10, Level 1 Emergency Power Supply System (EPSS) in accordance with Article 700 of NFPA 70 and Chapter 4 of NFPA 110 shall be provided for underground and enclosed stations.

5.4.8.5 Systems connected to the emergency power system shall include the following and shall comply with rules promulgated by the *fire code official*:

(1) Emergency lighting
(2) Protective signaling systems
(3) Emergency communication system
(4) Fire command center
(5) Elevators providing required egress capacity [see 5.3.6.4(5)]